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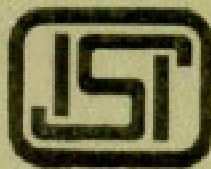


IS: 7925 - 1976

Indian Standard

SPECIFICATION FOR LOW ALLOY
TYPES OF ABRASION-RESISTANT
IRON CASTINGS

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SPECIFICATION FOR LOW ALLOY TYPES OF ABRASION-RESISTANT IRON CASTINGS

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Indian Standard

SPECIFICATION FOR LOW ALLOY TYPES OF ABRASION-RESISTANT IRON CASTINGS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 January 1976, after the draft finalized by the Cast Iron and Malleable Cast Iron Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Low alloy abrasion resisting white cast irons are used in a wide variety of applications including grinding balls, liner plates, breaker bars and sand or slurry pumps. For duties where abrasion or impact loadings are severe, grades of the materials specified in IS : 4771-1972* are normally recommended. The structures of the white cast irons consist of hard iron carbides in a pearlitic matrix. They are normally free from graphite except where its occurrence is unavoidable, as in heavy slowly cooled sections, or where their presence is specifically requested or permitted by the purchaser.

0.3 Low alloy white cast irons are made in several ranges of composition and this standard has been prepared to rationalize their compositions. The permitted ranges for the elements carbon, silicon and chromium enable the supplier, in other than very heavy section castings, to avoid the presence of graphite. Heat treatment is not normally beneficial when supplying these irons, but attention is drawn to one grade contained in this specification which is heat-treated (*see 9*) to provide some measure of machinability. Abrasion resistance is correspondingly reduced.

0.4 For the benefit of the purchaser particulars to be specified while ordering low alloy types of abrasion-resistant iron castings have been included in Appendix A.

0.5 In the preparation of this standard, assistance has been derived from BS 4844:Part I:1974 'Abrasion resisting white cast irons, Part I: Unalloyed and low alloy grades', issued by the British Standards Institution.

0.6 This standard contains clauses **7.1**, **8.1**, **11.2**, **11.3** and **13.2** which require the purchaser to specify his requirements, if necessary, while placing an order.

*Specification for abrasion resistant iron castings (*first revision*).

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for low alloy types of abrasion-resistant iron castings.

2. GRADE

2.1 There shall be three grades of low alloy types of abrasion-resistant iron castings.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to supply of low alloy types of abrasion-resistant iron castings shall be as laid down in IS:1387-1967†.

4. MANUFACTURE

4.1 The castings shall be made by any suitable melting process.

5. CHEMICAL COMPOSITION

5.1 The chemical composition of the metal for the different grades of low alloy types of abrasion-resistant iron castings when analyzed in accordance with IS:228-1959‡ shall be as given in Table 1.

TABLE 1 CHEMICAL COMPOSITION AND HARDNESS OF LOW ALLOY TYPES OF ABRASION-RESISTANT IRON CASTINGS

(Clauses 5.1, 10.1, 12.1 and 12.2)

GRADE	CHEMICAL COMPOSITION, PERCENT					HARDNESS HB, Min
	C	Si	Mn	Cr, Max	P, Max	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	2.4-3.4	0.5-1.5	0.2-0.8	2.0	0.15	400
2	2.4-3.4	0.5-1.5	0.2-0.8	2.0	0.5	400
3	2.4-3.0	0.5-1.5	0.2-0.8	2.0	0.15	250

NOTE 1 — Grade 3 is heat treated to provide some measure of machinability. Abrasion resistance is correspondingly reduced.

NOTE 2 — The low phosphorus content Grade 1 is preferred where resistance to impact loading is required.

*Rules for rounding off numerical values (revised).

†General requirements for the supply of metallurgical materials (first revision).

‡Methods of chemical analysis of pig iron, cast iron and plain carbon and low alloy steels (revised).

6. WORKMANSHIP AND FINISH

6.1 The castings shall be accurately moulded in accordance with the pattern or working drawings supplied by the purchaser, with the addition of such letters, figures and marks as may be specified.

6.2 The drawings shall specify tolerances on all important dimensions.

7. FREEDOM FROM DEFECTS

7.1 The castings, as delivered to the purchaser shall be free from distortion and injurious defects. By agreement between the purchaser and the manufacturer, any casting defects may be rectified, provided they do not interfere with the ultimate use of the castings. Though welding is not recommended minor repair welding is possible but shall not be carried out except with the approval of the purchaser.

8. MICROSTRUCTURE

8.1 If agreed to between the purchaser and the manufacturer the castings or suitable test samples may be subjected to metallographic examination. The location of test samples, nature of required microstructure and the area used for examination shall be decided by mutual agreement of the purchaser and the manufacturer.

9. HEAT TREATMENT

9.1 Unless otherwise agreed between the manufacturer and the purchaser, the castings produced in Grades 1 and 2 shall be supplied in the as-cast condition. For Grade 3 the castings shall be in the heat treated annealed condition, the cycle selected being at the discretion of the supplier to comply with the hardness requirements.

10. HARDNESS

10.1 If specified by the purchaser, the material shall conform to the requirements given in Table 1.

10.1.1 The hardness test shall be carried out in accordance with IS:1789-1961*. Tungsten carbide ball shall be used for determining the hardness.

11. SAMPLING

11.1 For quality control during production, use of control chart technique is recommended to the manufacturer for which reference is invited to IS:397 (Part I)-1972†. The results of such tests done at a place of manufacture may be made available along with the material supplied, to enable the purchaser to judge its acceptability.

*Method of Brinell hardness test for grey cast iron.

†Methods of statistical quality control during production: Part I Control charts for variables.

11.2 Sampling for Chemical Analysis — Analysis shall be carried out either on the casting or on a test sample made from the same melt. In the case of continuous melting the frequency of sampling shall be one per two hours of production or as decided by agreement between the manufacturer and the purchaser.

11.3 Sampling for Hardness Test — If specified by the purchaser, test shall be carried out either on finished casting or test bar representing each heat-treatment batch but at least one test shall be carried out from each melt (in case the castings from two or more melts are heat-treated in one batch). In the case of continuous melting, sufficient number of samples shall be provided to ensure at least one test per hour of production.

12. RE-TEST

12.1 Chemical Analysis — If a sample selected under **11.2** fails to meet the requirements given in Table 1, the purchaser shall select two further samples from the same lot. If both the samples satisfy the specified requirements, the castings represented shall be accepted. If either of the samples fail, the castings represented shall be deemed as not complying with this standard.

12.2 Hardness Test — If a sample selected under **11.3** fails to meet the requirements given in Table 1, two further samples shall be selected from the same lot and in case the castings have been heat-treated from the same heat-treatment batch. The consignment shall be considered to conform to the requirements if both the additional tests are satisfactory. Should either of the samples fail, the castings represented shall be deemed as not complying with this standard. If the castings are supplied in the heat-treated condition, the manufacturer shall have the right to reheat-treat the product, if he so desires, in any suitable manner before two fresh samples are taken for testing. Should the two tests satisfy the requirements of this standard, the lot shall be accepted. Should either of the samples fail, the castings represented shall be taken as not complying with this standard.

13. MARKING

13.1 Where practicable, each casting shall be legibly marked with an identification mark by which it can be traced to the melt and the batch of heat treatment, where applicable, from which it was made.

13.2 By agreement between the purchaser and the manufacturer, castings complying with the requirements of this standard may, after inspection, be legibly marked with an acceptance mark.

13.2.1 The castings may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

APPENDIX A

(Clause 0.4)

INFORMATION TO BE SUPPLIED BY THE PURCHASER

A-1. BASIS FOR ORDER

A-1.1 While placing an order for the purchase of low alloy types of abrasion-resistant iron castings covered by this standard, the purchaser should specify the following:

- a) Grade required;
- b) Drawing or reference number of the pattern (if supplied by the purchaser), along with a copy of the drawing;
- c) Tests required;
- d) Whether the castings are to be inspected and tested in the presence of the purchasers' representative;
- e) Condition of delivery;
- f) Any special requirements; and
- g) Test reports, if required.

INDIAN STANDARDS

ON

CAST IRON AND MALLEABLE CAST IRON

IS :

- 210-1970 Grey iron castings (*second revision*)
- 1230-1968 Cast iron rainwater pipes and fittings (*first revision*)
- 1536-1976 Centrifugally cast (spun) iron pressure pipes for water, gas and sewage (*second revision*)
- 1537-1976 Vertically cast iron pressure pipes for water, gas and sewage (*first revision*)
- 1538-1976 Cast iron fittings for pressure pipes for water, gas and sewage (Parts I to XXIII) (*second revision*)
- 1729-1964 Sand cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories
- 1865-1974 Iron castings with spheroidal or nodular graphite (*second revision*)
- 1879-1975 Malleable cast iron pipe fittings (Parts I to X) (*first revision*)
- 2107-1962 Whiteheart malleable iron castings
- 2108-1962 Blackheart malleable iron castings
- 2640-1964 Pearlitic malleable iron castings
- 2749-1974 Austenitic iron castings (*first revision*)
- 3005-1964 Grey cast iron ingot moulds, stools and slag ladles
- 3355-1974 Grey iron castings for elevated temperatures for non-pressure containing parts (*first revision*)
- 3486-1966 Cast iron spigot and socket drain pipes
- 3516-1966 Cast iron pipe flanges and flanged fittings, class 9, for petroleum industry
- 3896-1966 Comparison of Indian and overseas standards for iron castings
- 3989-1970 Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories (*first revision*)
- 4771-1972 Abrasion-resistant iron castings (*first revision*)
- 5519-1969 Deviations for untoleranced dimensions of grey iron castings
- 5531-1969 Cast iron specials for use with asbestos cement pressure pipes
- 5787-1970 Spheroidal or nodular graphite iron castings for paper mill dryer rolls
- 5788-1970 Iron castings with spheroidal or nodular graphite for pressure containing parts for use at elevated temperatures
- 5789-1970 Austenitic spheroidal iron castings for pressure-containing parts suitable for low-temperature service
- 6163-1971 Centrifugally cast (spun) iron low pressure pipes for water, gas and sewage
- 6331-1971 Automotive grey iron castings
- 6418-1971 Cast iron and malleable cast iron flanges for general engineering purposes
- 6629-1972 Cast iron rolls
- 7181-1974 Horizontally cast iron double flanged pipes for water, gas and sewage
- 7520-1974 Corrosion-resistant high silicon iron-castings

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